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ENERGY

No. 79

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CONTENTS

GENERAL

MODEL OF TIME LAG IN DEVELOPMENT OF FUEL AND POWER COMPLEX

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA OBSHCHESTVENNYKH NAUK in Russian No 6, 1981 pp 12-18

/Article by Yu. D. Kononov, Siberian Power Engineering Institute of the Siberian Department of the USSR Academy of Sciences (Irkutsk): "External Production Ties and the Time Lag in the Development of the Fuel and Power Complex"/

/Text/ The fuel and power complex, which encompasses an entire set of processes of the production, processing, transportation and distribution of energy resources, belongs to the most capital-intensive spheres of physical production. Up to 20 percent of the ferrous and nonferrous metals produced in the country, about 12 percent of the construction materials and more than 15 percent of the gross output of machine building are consumed directly or indirectly for its development. All this governs the strong dependence of the structure and rate of development of the fuel and power complex on the potentials of the sectors of the national economy, which supply it.

The production ties of the fuel and power complex with some sectors of industry are often of such a mediated nature that in order to study them it is necessary to enlist complicated calculating tools which model the intersectorial flows of products for operation and capital construction with allowance made for the lags. At the Siberian Power Engineering Institute a special dynamic model, which has received the name IMPAKT, has been developed for this purpose.[1]

By means of it, in particular, the role of the indirect material, monetary and labor expenditures, which arise in the sectors of the national economy, which are associated with the fuel and power complex, when the structure or rate of its development changes, was evaluated.[2] The calculations attest that a significant portion of these expenditures can form at remote levels of association. With the increase of the growth rate of power engineering the need for the additional development of a larger and larger number of related works arises, and this leads to an increase of not only the absolute, but also the specific (per unit of increase of the output of the fuel and power complex) associated capital investments.

The unsound exaggeration of the long-term rate of development of the individual sectors of the fuel and power complex can not only cause excessive material and monetary expenditures in the national economy as compared with the smoother change of the structure of the power balance, but also may be hard to realize, in particular, for the lack of time to place the corresponding production capacities into operation in the associated sectors.

The high output-capital ratio of the fuel industry and electric power engineering, their strong production ties with many fund-forming sectors of industry, the considerable expenditures of time on the building of power projects, on the creation of the infrastructure and the development of associated sectors--all this is giving rise to a large time lag of power engineering. It is manifested, in particular, in the impossibility of changing markedly in a short time the structure of the production capacities in individual sectors of the fuel and power complex and the structure of the power balance of the country. Thus, in the 20 years since the start-up of the first nuclear electric power station the proportion of AES's in the installed capacity of all the electric power stations of the USSR has reached only 3 percent.

Economic inertia by analogy with physical inertia can, apparently, be characterized by the forces which are necessary to change the trajectory (rate, structure, proportions) of the development of the given economic system. These forces with reference to power engineering are reflected in such indicators as 1) the total (direct and associated) capital investments in the entire power chain from the extraction (production) to the consumption of an additional unit of this energy resource; 2) the time required for the development of new fuel and power bases (including its expenditures on the creation of the infrastructure, on the reorganization of the power management of the users, on the expansion of production in associated sectors).

If the amount of capital investments is regarded as the main factor which causes the acceleration of the rate of development, the former of the named indicators can by physical analogy be identified with the mass which characterizes the inertia of the given system.[3] The larger this indicator is, the smaller the reaction of the system is to a change of the amount of capital investments.

To obtain an analytic expression of the indicator of the time lag of the fuel and power complex or any other sector (complex) e, it is expedient to represent the total capital investments as the sum of three components:

$$I_e^{\Sigma} = I_e + I_e^{c} + I_e^{n}, \qquad (1)$$

where I_e is the direct capital investments, I_e^c is the associated regular investments and I_e^n is the associated periodic investments.

Unlike the direct capital investments, the associated capital investments are used outside sector e, but stem from its development. Here the regular investments ensure the increase of the production of objects of labor, while the periodic investments ensure that of means of labor for sector e and the associated sectors.

The regular capital investments, like the direct capital investments, arise when it is necessary to increase production in sector e in question. They can be expressed as:

$$I_e^{c} = \sum_i c_i b_{ie} \Delta X_e, \qquad (2)$$

where c_i is the specific capital investments in sector i, b_{ie} is the total expenditures of the output of sector i per unit of output of sector e; ΔX_e is the increase of production (the placement of capacities into operation) in sector e.

The need for periodic capital investments of the first level of association appears when the absolute increments of production increase or, what is the same thing, when the direct capital investments in sector e increase. Taking this into account and disregarding $I_e^п$ of the remote levels of association (their dependence on I_e is of a more complex nature), we will write

$$I_e^п = \sum_j c_j b_{ji} f_{ie} \Delta I_e, \tag{3}$$

where f_{ie} is the expenditures of the output of sector i per unit of capital investments in sector e; ΔI_e is the increment of capital investments in sector e.

The regular and periodic capital investments react differently to a change of the rate of development of sector e. This can be seen from Figure 1, which depicts the dynamics of the capital investments in the gas industry under the conditions when during the first 10 years the average annual rate of production of gas was equal to 4 percent, but then ranges according to the version from 3 to 12 percent, remaining stable at the new level during the next decade.

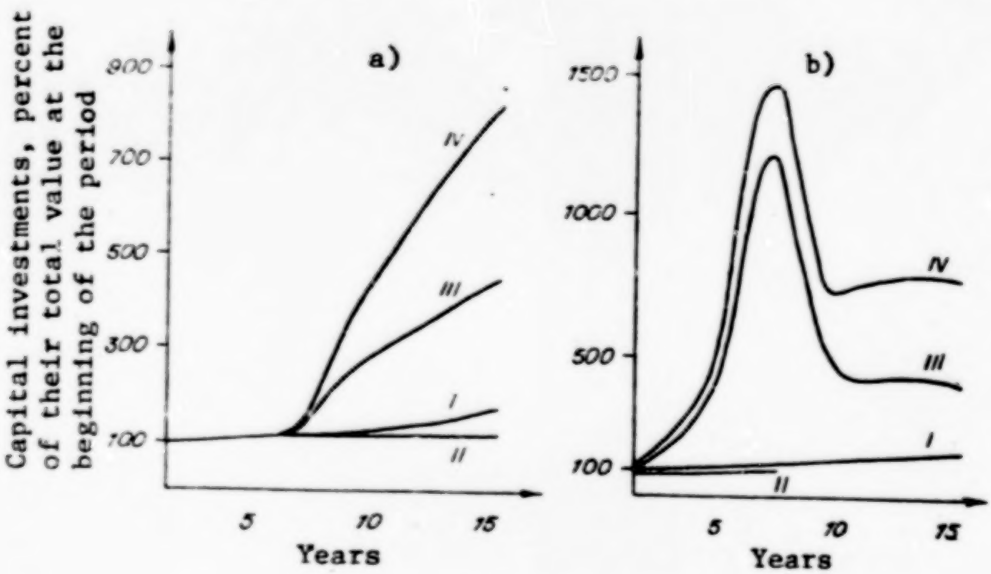

Figure 1. Dependence of the Dynamics of the Associated Capital Investments on the Rate of Development of the Gas Industry. a) the direct and associated regular capital investments; b) the associated periodic capital investments. The versions, which are distinguished by the growth rates of production during the second half of the 20-year period (during the first 10 years the rates are the same and equal 4 percent), are designated by numbers: version I--4 percent; version II--3 percent; version III--8 percent; version IV--12 percent.

With a constant rate of development (version I) the direct and associated capital investments increase smoothly and slowly. Here the values of $I^п$ are approximately a third as much as I^c and come to only 2 percent of the direct capital investments. With a slowing of the rate and the stabilization of the absolute increases of production (version II) the annual values of I and I^c also stabilize, while the need

for $I^{п}$ disappears entirely. It should be noted, however, that in all the versions the amounts of the direct capital-output ratio and materials-output ratio of extraction, as well as the distance of the transportation of the gas were taken to be identical and invariable. In a real situation these indicators may increase with the commitment to operation of less economical deposits and deposits which are more distant from the centers of consumption. Here the need for $I^{п}$ may arise even in the case of an invariable absolute amount of the annual increase of gas production.

A "surge" of $I^{п}$ (it can be regarded as expenditures on acceleration, on the overcoming of lags) precedes the acceleration of the rates of increase of gas production (versions III and IV). Then a decrease of the demand for periodic associated investments is observed. However, their amount remains five- to eightfold greater than at the start of the period in question and exceeds by two- to sixfold the need for regular investments. With respect to the direct capital investments the calculated values of $I^{п}$ are (for version IV) during the first 5-year period 6-20 percent, during the second--14-50 percent and during the third--7-10 percent. They are large enough so that they could be disregarded.

A peculiarity of $I^{п}$ before and after the acceleration of the rate of development of the gas industry should be noted. The "surge" to a considerable extent is formed by capital investments in the development of the mining and construction base and in the expansion of the production of metallurgical and metalworking equipment, construction machinery and other types of industrial products, which have a wide range of application and are assignable to the remote levels of association. The need of the gas industry and the sectors associated with it for these products decreases 5-10 years after the noted "surge" of the periodic capital investments. Accordingly a portion of the production capacities put into operation at the expense of these investments can be used for the development of other sectors of the national economy. The ties of the gas industry with metallurgy, the construction materials industry and the production of gas pumping units, drilling and other specialized equipment are characterized by great constancy. With high and nondecreasing annual increases of gas production these ties are maintained during the entire service life of the corresponding production capacities which were created at the expense of $I^{п}$.

It is necessary to emphasize that the determination of the amount of indirect capital investments for individual fuel bases or sectors of the fuel and power complex is fraught with the danger of their overestimation due to the failure to take into account the universality of the use of many types of industrial products and the noncoincidence in time of the demand of other users for these products. Thus, for example, the increase of the absolute increments of the production of natural gas may be accompanied by a decrease of the increments of the mining of coal, which will free for the gas industry or for other needs of the national economy the production capacities which previously supported the development of the coal industry. In this case the actually required indirect capital investments in the fuel and power complex will be less than in the case of the isolated examination of the gas and coal industries. Therefore one must strive for an evaluation of the indirect capital investments, just as the indirect material expenditures, for the complex as a whole.

In order to obtain the desired expression of the total capital investments per unit of increase of production in sector e, let us insert (2) and (3) in expression (1) and divided both of its parts by ΔX_e. After simple transformations we will obtain

$$c_e^{\Sigma} = c_e[1 + \alpha_e + \lambda_e(1 - 1/\tau_e)], \tag{4}$$

where c_e is the specific direct capital investments, $\alpha_e = \sum_i c_i b_{ie}/c_e$ is the ratio of the regular associated and direct capital investments, $\lambda_e = \sum_1 c_j b_{ji} f_{ie}$ is the limit (maximum) value of the specific periodic capital investments, τ_e is the index of the increase of the direct capital investments.

Expression (4) cannot be negative, therefore it is correct only for the values $\tau_e \geq 1$, that is, for conditions when the direct capital investments during the planned period are not less than during the preplanning period.

The values of the coefficients in expression (4) in many ways depend on the physical structure of the operating expenditures (for I_e^c) and the direct capital investments (for I_e^n) in sector e. Therefore they remain very stable in time, if fundamental changes do not occur in the enclosing objects of sector e. This stability makes it possible to use expression (4) for a rough estimate of the total specific capital investments of the versions of development of sector e, which are distinguished by the growth rates of the direct investments.

As the calculations using the IMPAKT model show, the numerical values of λ_e for the individual sectorial systems of the fuel and power complex lie within the range of 0.5 to 0.85, while those of α_e lie within the range of 0.02 to 0.2. For electric power engineering the value of α_e increases to 0.2-0.3, if the capital investments in the fuel supply of electric power stations are regarded as indirect. According to a rough estimate the amount of the total capital investments per unit of new capacity (including transport) during 1971-1975 in the coal and petroleum industries was 36-45 rubles/ton of conventional fuel, in the gas industry--70-75 rubles/ton of conventional fuel, in electric power engineering--330-340 rubles/kW.

In the future it is possible to anticipate an increase of these indicators, especially for the petroleum and gas industries, due to the worsening of the geological mining, natural and climatic conditions of extraction, the increase of the distance of transportation and the increase of the rate of retirement of the previously created production capacities. For these reasons the time for the development of new deposits of petroleum and gas will aparently increase. An increase of the time for the production of equipment and construction is occurring in the coal industry and electric power engineering under the influence of the concentration of production capacities. Thus, the standard term of construction of an open coal pit with a capacity of 3 million tons/year is equal to 3.5 years, while with a capacity of 6 million tons/year it is 4 years. A thermal electric power station with a capacity of 600 MW is built according to the standards in 3 years, while with a capacity of 2,400 MW--in 4.5 years.

The construction periods in power engineering also increase with the complication of the production technology and with the increase of the demands on the quality of equipment installation and the reliability of the facilities being built. Suffice it to say that it takes 2.5-3.5 years longer to build nuclear electric power stations than coal-powered electric power stations, while the organization of offshore petroleum production or the production of synthetic fuel from coal requires, according to U.S. data, 3-6 years longer than the development of petroleum deposits on dry land.

If 2-3 years for all the stages of designing and surveying are added to the indicated construction periods, it will become obvious that not less than 5-8 years pass from the time of the making of the decision to build a project to its placement into operation. With assimilating fundamentally new technology their periods might be extended to 10-12 years and more. From this follows the extremely great time lag of power engineering over a 5-year time segment: the main increase of output during the five-year plan to a considerable extent is predetermined during the preceding 5-year period.

Another aspect of the time lag, which is determined by the possible periods of the increase of new production capacities in the sectors of industry associated with power engineering, is also important. The required lead in their development depends on the absolute amount and rate of increase of the production of energy resources, as well as on their type (Figure 2).[4] The greater these increases are, the broader the group of associated sectors is and the stronger the external production ties of the fuel and power complex are. The time lag also increases accordingly.

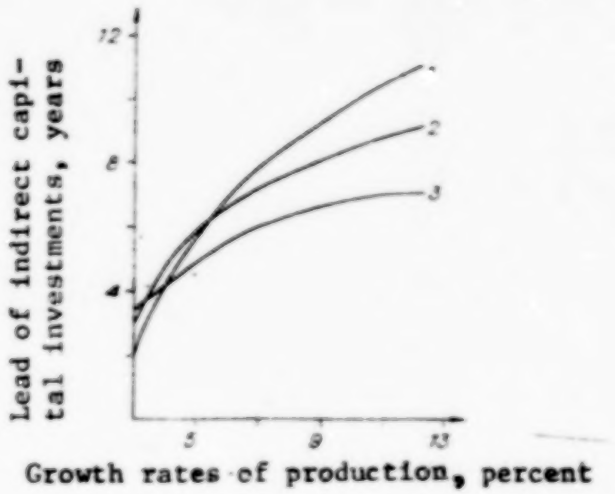

Figure 2. Dependence of the Time of the Start of Capital Investments in Associated Sectors on the Growth Rate of Fuel Production. 1--gas, 2--petroleum, 3--coal (open pits)

The table illustrates what has been said on the basis of the example of the gas industry on the assumption that the placement of additional production capacities into operation in the associated sectors begins at the moment when the estimated need for them reaches a specific amount: for rolled products and cement--500,000 tons a year, metallurgical equipment--15,000 tons a year, machine tools and forge and press machines--5,000 units a year.

The untimely or insufficient development of associated sectors can lead to a decrease of the amount of the annual increase of fuel production. Calculations using the optimization dynamic model of the external ties of power engineering were made

in order to estimate the scale of this decrease on the very first approximation.[5] The interdependent change of the individual fuel bases and the interregional flows of fuel as compared with the optimum version in the case of a decrease during the first 5 years of the 15-year period under review of the placement into operation of the capacities, which supply the fuel and power complex and the sectors associated with it with rolled ferrous metal products, was examined.

Required Lead of the Placement of Capacities Into Operation in Several Sectors for the Increase of the Production of Natural Gas, Years

Increase of production, billions of m^3/year	Rolled products	Cement	Metallurgical equipment	Metalworking equipment
10	3-4	4-5	--	--
20	4-5	5-6	6-7	--
50	6-7	6-7	7-8	--
80	7-8	8-9	9-10	10-12

According to calculations the rate of development of the gas industry has slowed, and to cover the formed fuel shortage it was necessary to expedite the development of the coal industry. Here it turned out that it is possible to decrease the power balance of the country, if the decline of the production capacities in ferrous metallurgy as compared with the optimum plan does not exceed 0.7 million tons/year.

The estimated decrease of the amount of the annual placement of new capacities into operation in the gas industry is (billions of m^3/year):

With a shortage of capacities in milling	In 4-5 years	In 9-10 years
0.4 million tons/year	3.7	-
0.7 million tons/year	5.3	3

The dependence of the duration of the negative consequences for the gas industry on the amount of the decrease of the growth of capacities in ferrous metallurgy attracts attention. If this growth decreases at the beginning of the period by 0.4 million tons/year, this affects primarily the production of pipe for gas pipelines, which is then reestablished, ensuring during the second 5-year period the same annual increase of gas production as in the optimum version. However, the absolute production volume after 10 years remains less than the optimum volume. With a shortage of capacities in milling of 0.7 million tons/year the lack of metal affects the production of not only pipe, but also pumping and compressor, metallurgical and other equipment. This leads to an additional decrease of the amount of the annual growth of gas production and to the protraction of the time for the restoring of this amount to the optimum amount by more than 5 years as compared with version I.

The possibilities of increasing the stability of the development of the fuel and power complex and of decreasing its time lag by the shifting of resources and reserves on the national economy level, as well as by the use of imported equipment and materials are not taken into account in these calculations.

In spite of the great conditionality of the obtained results, they show that the decisions on the development of the sectors associated with power engineering, which are made for the stage of 5-year planning, in many ways determine the development of the fuel and power complex for the following 5-10 years. As the plan is implemented, the possibilities for maneuvering decrease, while the time lag of the development of power engineering increases. The expenditures for adaptation in case of previously unenvisaged changes in the external and internal conditions of development increase accordingly. Therefore it is important already in the process of long-range planning to take into account the incompleteness (ambiguity) of the information on the future and to envisage special adaptive measures, which are aimed at the increase of the flexibility of the decisions being made and the decrease of the time lag of both individual sectorial systems and the fuel and power complex as a whole.

Such an approach to planning supplements the concept of the optimum with a new content, since the plan should be optimal not only with respect to the direct expenditures on the development of the system, but also with respect to the level of reliability, flexibility, elasticity and stability, which is specified from a national economic standpoint.[6] In this connection the estimation and proper consideration of the total expenditures on the development of the fuel and power complex, including the expenditures on the development of associated sectors and on adaptation to changes in the conditions of operation, which are possible in the future, are acquiring great importance.

FOOTNOTES

1. Yu. D. Kononov, A. G. Korneyev, V. Z. Tkachenko, "The Modeling of the External Production Ties of the Sectorial System," EKONOMIKA I MATEMATICHESKIYE METODY, Vol XV, No 5, 1979, pp 969-975.

2. K. L. Yershova, Yu. D. Kononov, A. G. Korneyev, "Some Results of Experimental Studies of the External Production Ties of the Power System," "Voprosy issledovaniya vneshney svyazey" /Problems of the Study of External Ties/, Irkutsk, SEI SO AN SSSR, 1972, pp 53-74.

3. Taking into account the dependence of the associated expenditures on the rate of development of the system, the analogy between the specific capital investments and the mass as a measure of inertia should be sought not in mechanics, but in hydrodynamics, in which the increase of the resistance of a fluid when stopping the movement of a body is taken into account by means of the concept "associated mass."

4. Figure 2 was constructed on the assumption that during the "preplanning" period the rate of increase of production was equal to 5 percent a year. There is conditionally taken as the start of the capital investments the year when their total in all the associated sectors exceeds 100 million rubles. Of course, in the case of other "threshold" values of the initial capital investments the required lead will change.

5. "Metody i modeli dlya issledovaniya optimal'nykh napravleniy dolgosrochnogo razvitiya toplivno-energeticheskogo kompleksa" /Methods and Models for

Studying the Optimum Directions of the Long-Term Development of the Fuel and Power Complex/, edited by A. A. Makarov, Irkutsk, SEI SO AN SSSR, 1977, 90 pages.

6. V. A. Smirnov, S. V. Gerchikov, V. G. Sokolov, "Otsenka nadezhnosti i manevrennykh kachestv plana" /The Evaluation of the Reliability and Flexible Qualities of a Plan/, Novosibirsk, Nauka, 1978, 316 pages.

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THIN-SEAM DONBASS COAL MINES HAVE SPECIAL FIXED-CAPITAL CONCERNS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 5, May 81 pp 44-47

[Article by I. Kulakov, lecturer and candidate of economic sciences (Donetsk): "The Effectiveness of the Renewal and Utilization of Fixed Capital at Coal Mines"]

[Text] The coal industry is one of the most capital-intensive branches of the national economy. In the process of reequipping the coal mines with machinery, the number of longwalls that have been assigned mechanized complexes has grown, and the share of coal mined from breakage faces by means of narrow-front machinery and the level of mechanization and automation of the production processes have risen. This has promoted growth in the labor productivity of workers who mine coal and a rise in the miners' work safety.

However, the intensification of coal mining at thin seams of Donbass [Donets Coal Basin] mines (especially of the Donetskugol' Association) that is linked with a deepening of mine workings by 16 meters per year and a worsening of mine-geology conditions (reduced thickness of the seams, increased gassiness of the mines, and other conditions) have led to a rise in the costs of doing mining work, an increase of capital intensiveness and of various operating costs, and a reduction in the pace of labor productivity growth.

While mine-geology conditions, which are evaluated under a 5-point system of cadastral evaluations (seam thickness, dip angle, depth of workings, gassiness and amount of reserves), remained about the same (at the 4.4-point level) during 1966-1980 at the underground mines of the Kuznetsk, Moscow and Pechora Coal Basins, they deteriorated from 3.4 points to 3.2 points during this same period in the Donetskugol' Association.

Further expansion in the area of the use of serially-produced narrow-front cutter-loaders with mechanized mine supports at many Donbass mines has been restricted by the fact that more than 70 percent of the coal reserves are concentrated in seams of 0.5-1.1 meter thickness.

The prerequisites have not been created yet at thin seams in the Donbass for supplying mine faces with mechanized complexes, and the production of wide-front cutter-loaders and of cutting machines by the country's coal-machinery manufacturing plants has even been curtailed. Coal machinebuilding plants are not motivated to produce basic models of machinery, such as mechanical pick-hammers for excavating high-quality coal at thin seams, since these articles are included in the second quality category.

Because of this, it becomes necessary to refine the concepts of the technical level and quality of machines. In examining the development of machines for big industry, K. Marx wrote: "Mathematically and mechanically...they say that the implement is a simple machine, while the machine is a complicated implement. They do not see any essential difference between them and even the simplest mechanisms, such as the lever, the inclined plane, the screw, the wedge, and so on, and they call them machines....However, from the economic point of view this definition is completely unsuitable, because it lacks the historical element."* Then K. Marx points out the conversion in the process of developing production, from workers' implements to machines that carry out one or several operations, and to an automatic system of machines, as well as the effect of this transition on the displacement of the isolated worker by the collectivized worker and on the establishment of a cooperative character in the work process.

Proceeding from these principles, it is possible to trace the rise of the technical level of the production processes with the development of coal mining, from the miner's pick to the pick-hammers, cutting machines, wide-front and narrow-front cutter-loaders, and mechanized and automated mining complexes. We are talking here about technical novelty and improvement of the design of machines, their capability at each new level to raise productivity greatly and to facilitate and to replace partially or completely the labor of manual workers. At the same time, the quality of the machines is characterized, first of all, by their suitability, efficiency and longevity.

It must be kept in mind that machines (and things in general) can be compared in respect to quality only if they are to satisfy the very same social requirement and are to be used under identical conditions. In this case, the inequity in assessing cutting machines and mechanical pickhammers as being of the second quality category just because highly productive longwall-mining complexes are being produced for the coal industry is obvious. Since longwall-mining machines and units are not suitable for digging coal at thin seams, cutting machines and mechanical pick-hammers are the sole means for mechanizing coal mining under these conditions.

The reequipping of aviation is an example of the output of machines of different technical levels of equal quality. With the conversion to gigantic supersonic jet airplanes, slow-moving piston planes still have been a reliable means of air transport for many years in regions difficult of access, and helicopters have been created and are being used efficiently.

For the Donbass's coal industry, solution of the problem of increasing the mining of valuable Donets coal and of raising production effectiveness is linked with the need to intensify scientific research and experimental design for creating basically new, highly productive machines for excavating thin seams that will completely free workers of heavy physical labor, and with the renewal and effective use of production capital.

As a result of reequipping the Donetskugol' Association's underground mines with machinery during 1969-1977, the technical level of production rose substantially. Characterized by the share of coal mining performed by longwall-mining machines, narrow-front cutting machines and wide-front cutting machines with the coefficients

*Marx, K. and Engels, F., Soch. [Works], Vol 23, pp 382-283.

of 1, 0.75, 0.5 and 0.25 (proportional to labor productivity), it was 0.6 in 1968 and 0.8 in 1977, that is, it grew by 20 percent. In so doing, capital intensiveness rose 1.5-fold (from 32.40 to 48.45 rubles per ton), labor productivity per worker who mines coal by 31 percent (from 27 to 35.4 tons per month), and adduced specific expenditures (from 24.30 to 29.79 rubles per ton).

As the mines that were working seams more than 1 meter thick became heavily supplied with new equipment, growth in technical level had sharply slowed by 1975 (during the next 3 years it was 4 percent versus 16 percent for the first 6 years), and capital intensiveness grew greatly because of the deterioration of mine-geology conditions. Labor productivity did not increase in the next 3 years, because of both the worsened conditions and the reduction in the work week from 36 to 30 hours.

The causes of substantial growth of capital intensiveness--the basic indicator of the effectiveness of renewal and use of fixed capital--were, along with the deepening of the mines and worsening of mine-geology conditions, as follows.

A majority of the underground mines that were built prior to the Great Patriotic War (including the half of them that were built prior to the Great October Socialist Revolution) have restricted throughput for such elements of production as underground conveying and elevating work. This hampers the development of mining operations and growth in productive capacity. Under the existing reporting procedure, part of the completely amortized fixed capital continues to be counted in accordance with the original cost, which, of course, increases capital intensiveness. At some mines there is expensive inactive equipment.

As a result of nonproportional reequipping and rebuilding, reserve production capacity is being formed in some elements of production and bottlenecks at others. These, in turn, do not allow the mines' productive capacity to be increased or the existing funds to be used completely.

Because of the delay of operations for reconstruction and transfer to lower horizons, coal is being mined mainly at inclines for lifting coal, which are less effective and more expensive than inclines for lowering coal. Because of the inadequate reliability of mine-face and transport equipment and the lack of spare parts for repair, this equipment is idle and the workload at the mine face and at the mines is reduced. Losses of time during work shifts is 13 percent, not counting idle time for whole shifts.

While capital investment suffers restrictions, it is sometimes used irrationally and does not help to increase production capacity. Thus, reequipping and rebuilding were accomplished at the Underground Mine imeni Chelyuskintsev in 1977. Of the total sum of 1.2 million rubles, 210,000 rubles (17.5 percent) were spent on control and communications. With the use of standard design and unified equipment, expenditures can be reduced 10-fold and allocated funds can be used to acquire new mine-face equipment.

Plants for making coal machinery that have not achieved a proper level of standardization, unification and quality of the mining equipment produced, have, at the same time, set excessive prices for new equipment, since they are not motivated to reduce prime production costs through specialization and subcontracting.

In order to make an analysis of the effect of various conditions and factors on the technical and economic indicators of mine operations, we have worked out combined statistical groupings.

Table 1 shows the effect of mine-geology conditions and the capital-labor ratio (average annual fixed capital per worker, for the active portion of the capital) on technical level, labor productivity, capital intensiveness and specific adduced expenditures. It should be pointed out that from 1969 through 1977 the overall capital-labor ratio grew by 59 percent, the active portion growing by 109 percent.

Table 1

The Effect of Mine-Geology Conditions and Capital-Labor Ratio on Technical and Economic Indicators

Mine-geology conditions, on a 5-pt scale	Capital-labor ratio, rubles	Number of mines	Technical and economic indicators			
			Technical level of output	Labor productivity (tons per month)	Capital intensiveness (R/ton)	Adduced expenditures
3.....	Up to 5,000 (3,780)	6	0.72	25.6	62.20	38.42
	More than 5,000 (6,320)	4	0.82	40	57.50	30.50
Overall	4,800	10	0.77	31.2	60.32	35.27
3.6.....	Up to 5,000 (4,050)	5	0.76	33.1	39.45	26.64
	More than 5,000 (6,584)	5	0.89	45.8	36.05	21.95
Overall	5,340	10	0.83	39.5	37.75	24.29
	Up to 5,000 (3,900)	11	0.75	29	51.85	32.20
	More than 5,000 (6,470)	9	0.86	43.2	45.63	25.70
Altogether	5,070	20	0.80	35.4	48.45	29.79

It is evident from table 1 that mine-geology conditions (3 and 3.6 points) strongly affect capital-intensiveness (the deviation is 22.57 rubles per ton) and specific adduced expenditures, and also, although to a lesser extent, technical level and labor productivity. The capital-labor ratio (for the active portion), which reflects technical progress, greatly influences labor productivity and specific adduced expenditures and, in so doing, is related in a lesser degree to capital intensiveness.

In 1977 the coefficient of renewal of fixed capital was 8 percent (18 percent for the active portion), that is, 2-fold higher than in 1969 (at mines working under more favorable geological conditions, the coefficient of renewal reached 10 and 20 percent, respectively, in 1977).

An overall characteristic is the fact that, as the capital-labor ratio increases, the indicators of the economic effectiveness of production improve directly as a function of mine-geology conditions.

Table 2 reflects the effect of mine-geology conditions and mine productivity on technical and economic indicators. Average productivity per mine increased by 10 percent during 1970-1977. Mine productivity denotes the level of organization of production and the concentration of mining operations, and, to a great degree, it affects the level of use of fixed capital and the economic effectiveness of production as a whole. Where the annual workload at a mine increases, labor productivity increases greatly and capital intensiveness and specific adduced expenditures are reduced. The annual workload at breakage faces depends upon mine-geology, organizational conditions and, in great measure, the type of excavating machine. In 1977 the average workload per mine face for the Donetskugol' Association was: for those with longwall mining machines--260,000 tons (the highest--more than 500,000 tons--was in P. S. Nergutsa's brigade of the Underground Mine imeni Zasyad'ko); with narrow-front cutter-loaders--150,000 tons (the highest was more than 1 million tons, in I. I. Strel'chenko's section of the Underground Mine Trudovskaya); with wide-front cutter-loaders--90,000 tons (the highest was 130,000 tons, at the Underground Mine Abakumov); and with cutting machines--75,000 tons (the highest was 120,000 tons, at the Kuybyshev Underground Mine Administration).

Table 2

The Effect of Mine-Geology Conditions and Mine Productivity on Technical and Economic Indicators

Mine geology conditions, on a 5-pt scale	Annual mine productivity (thousands of tons)	Number of mines	Technical and economic indicators			
			Technical level of output	Labor productivity (tons per month)	Capital intensiveness (R/ton)	Adduced expenditures
3.....	Up to 1,000 (665)	7	0.71	30.4	68.95	37.60
	More than 1,000 (1,320)	3	0.90	33.2	44.50	29.60
Overall	860	10	0.77	31.2	60.32	35.27
3.6.....	Up to 1,000 (780)	4	0.80	36.7	36.40	25.40
	More than 1,000 (1,390)	6	0.85	41.3	38.50	23.50
Overall	1,165	10	0.83	39.5	37.75	24.29
	Up to 1,000 (705)	11	0.74	32.7	56.00	33.20
	More than 1,000 (1,360)	9	0.87	38.5	40.50	25.50
Altogether	1,010	20	0.80	35.4	48.45	29.79

It has been established that as the workload per mine and per mine face increases, all technical and economic indicators improve consistently. Based upon an analysis of the results of reequipping underground coal mines during the past 8 years, the following ways for raising the effectiveness of the renewal and use of fixed capital have been identified.

Measures for reequipping various production elements should be planned to take into account the potential for increasing the productive capacity of the mine as a

whole. In order to eliminate bottlenecks, the simultaneous reequipping and rebuilding of mines must be stipulated. This way, the capital intensiveness for Donetskugol' Association can be reduced by 4 rubles per ton.

Steps must be taken to introduce all available equipment into operation or to transfer uninstalled and unneeded equipment to other mines (the value of inactive equipment nowadays is about 1 million rubles).

It is desirable that amortized fixed capital be figured not at the original cost thereof but at the residual value. Prices for new machines should be determined by the plants that make the coal machinery, taking into account provisions for making their use economically effective by insuring that an increase in prices will not surpass the growth in labor productivity when these machines are used. Plans for reequipping should be coordinated with plans for supplying materials and equipment.

It is desirable to expand the self-financing of reequipping through the use of the resources of the production-development fund and bank credits, which will provide an incentive for the mines to acquire more effective machines and equipment. It is necessary also to develop a system of economic incentives for mine workers to make effective use of fixed capital (in accordance with the experience of the Machine-building Association imeni Frunze in Sumy).

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ENERGY CONSERVATION

NOT ENOUGH ATTENTION PAID TO SAVING FUEL BY WASHING WINDOWS

Moscow IZVESTIYA in Russian 11 Aug 81 p 3

[Article by Yu. Yutilov, candidate of chemical sciences and senior scientific staff worker of the Institute of Physical Organic Chemistry and Carbon Chemistry of the UkSSR Academy of Sciences, and N. Lisovenko (Donetsk): "Washed Glass Can Save Billions of Kilowatt-Hours of Electricity"]

[Text] Surely everyone notices that, as time passes, the transparency of window glass is reduced and its surface gets dim and becomes scored. In industrial areas particles of iron, carbon and other things eat into the glass. They form stable layers of deposits that cannot be removed by ordinary methods. The sunlight passes through sooted shop windows and greenhouse roofs and walls with difficulty, and because of this structures are in semidarkness, the consumption of electricity increases, and yield is greatly reduced.

Attempts have been made for a long time to solve the problem of cleaning glass. It is washed with water and various solutions and it is rubbed with sand, but these are only half measures. More often than not it becomes necessary after 3-5 years to change the glazing completely.

In 1975 staff workers of the Institute of Physical Organic Chemistry and Carbon Chemistry of the UkSSR Academy of Sciences in Donetsk developed a simple and effective agent for cleaning glass surfaces. The positive experience of Zirka Sovkhoz, close to Zhdanov, where the new preparation was used for the first time, drew the attention of the supervisors of many farms as well as of industrial enterprises.

In 1977 UkSSR Gosplan prepared a draft that called upon the forces of the institute and of 6 republic ministries, as well as of UkSSR Goskomsel'khoztekhnika [State Committee for Supplying Production Equipment to Agriculture] to conduct in 1978-1980 a program of scientific-research, design and organizational work aimed at introducing as rapidly as possible the chemical cleaning of glass and electrical insulators at the republic's industrial enterprises and farm hothouses. However, the program was not implemented because UkSSR Goskomsel'khoztekhnika, UkSSR Minsovkhozov [Ministry of State Farms], UkSSR Minsel'khoz [Ministry of Agriculture], UkSSR Minchermet [Ministry of Ferrous Metallurgy] and UkSSR Minenergo [Ministry of Power and Electrification] did not carry out the tasks set for them.

Despite the difficulties that arose because of such attitudes on the part of the co-executors, the Institute of Physical Organic Chemistry and Carbon Chemistry of the UkSSR Academy of Sciences did its part of the work on time and in the full

amount. The scientists managed to improve radically the formula of the solutions intended for cleaning glass and ceramics. Instead of scarce fluoric acid, which the first preparation was based on, more readily available and cheaper industrial-grade raw materials produced at Minudobreniya [Ministry of Fertilizers] enterprises were proposed. Today thousands of tons of it are being produced in the country. The demand for it is an insignificantly small amount. About 300 tons are needed to clean the glass of all branches of our country's economy.

This substance is easy to transport and simple to store and use. The prime production cost of a cubic meter of the working solution is about 5 rubles, but only about a fifth of a cubic meter is required for cleaning glass 1 hectare in area. The technology for treating glass surfaces is very simple, consisting primarily of watering the soiled windows with the solution and water at definite time intervals.

More than 1 million square meters of glass surface at 26 farms in our country have been cleaned by the new "cosmetic" for glass, and the cost of the cleaning was 2.8 to 3 rubles per 1 square meter [as published]. According to the most modest estimates, an economic benefit of 2.5 million rubles was obtained.

But this is only a start. Hothouse glass everywhere should be cleaned, and a completely correct measure for those farms that do not wish to introduce the new method would be to reduce the ceiling on window glass and electricity. Of course, one can concur with the hothouse combines' managers who complain about the lack of equipment for cleaning glass and the specialized organizations that could carry out the work under the conditions prescribed. Yes, it is possible to agree, but inactivity cannot be justified. For it is possible to organize glass washing with one's own forces.

Glass washing is a concern not only of workers who grow hothouse vegetables. An enormous amount of electricity is lost because of soiled glass in enterprise departments. Thus, by increasing the share of natural illumination, as much as 4 million kilowatt-hours and as many as 50,000 electric-light bulbs can be saved in a year at the Novyy Kramatorsk Machinebuilding Plant in the Donbass. For the country as a whole, according to extremely rough estimates, 12-15 billion kilowatt-hours, which is 1 percent of the total annual electricity generated in the country, can be saved this way each year. If one adds that such an approach to the matter can also save many millions of electric-light bulbs, which means savings of tungsten and other scarce nonferrous metals, then it is clear that the problem of clean glass is of enormous significance.

Clean glass enables the sanitary and hygienic conditions of the workplace to be improved. This should promote labor productivity growth, a rise in output quality, and a reduction in the amount of job-related illness. In our day increasing importance is attached to the "illumination factor," and it is believed that when this is considered correctly, our country can obtain additional billions of rubles of national income annually.

There can be immense economic advantage from chemical cleaning of the surfaces of electrical insulators on high-voltage transmission lines. At electric-power substations, millions of expensive glass and porcelain insulators have been installed, which, like the glass in shops and hothouses, become covered in time with dirty deposits. This leads to losses of electricity and emergency outages.

A staff created by Donetsk scientists has enabled the surfaces of such insulators to be washed completely, without causing corrosion of the metal fixtures. The cleaning can be done directly at power transmission lines and substations without disassembly, requiring only that the line be de-energized.

The new washing solution can be used also for cleaning buildings that are faced with vitrified or ceramic slab and for cleaning household ceramic articles, cut glass, and so on.

The sphere of use of the preparation is practically unlimited. An enormous number of inquiries are arriving at the institute, which is in no position to satisfy them. The scientific aspect of the question has already been solved: the agent is effective, and, when it is used, hothouses can obtain a substantial growth in yield. This is confirmed by the experience of tens of farms, including the sovkhozes Klyuch in Permskaya Oblast, Zavolzhskiy in Yaroslavskaya Oblast, Zirka in Donetskskaya Oblast, and others: the life of the glass is prolonged and enormous amounts of electricity and, consequently, of fuel are saved.

In light of the recent CPSU Central Committee and USSR Council of Ministers decree, "On Strengthening the Work to Save and Make Rational Use of Raw-Material, Fuel-and-Power and Other Material Resources," questions about the preparation for glass cleaning and the use of this preparation should be resolved with greater motivation, for this is a question of great national economic importance. Science has had its say. Today it is necessary to design and create the equipment for glass-cleaning work and to organize special services so the "clean-glass effect" can be used in full measure.

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REFLECTOR-TYPE SOLAR POWER PLANT BEING BUILT IN CRIMEA

Moscow TRUD in Russian 19 Jul 81 p 1

[Article by A. Zadunov (Krymskaya Oblast): "Solar Energy's Firstling"]

> [Text] The "Main Directions" called for an increase in the scale of use of renewable energy sources (hydraulic, solar, wind and geothermal) in the national economy during the 11th Five-Year Plan. The firstling of solar-energy technology is now being erected in the Crimea.

On the shore of the Sea of Azov, in Crimea's Leninskiy Rayon, where the steppe village of Mysovoye spreads out, a solar electric-power station of 5,000 kilowatt capacity is being built. In 2 years the energy of daylight will light up bulbs in the homes of those who are today building this SES [solar electric-power station], and the Aktashskaya Nuclear Power Station will be erected here in its vicinity.

In designing the firstling, which will give birth in our country to solar power, specialists of the Riga Division of Teploelektroproyekt [All-Union State Design Institute for the Design of Electrical Equipment for Heat-Engineering Structures] and other organizations ascribed to it principally the role of an experimental rather than an industrial installation. An SES has, let's say, an indisputable advantage over thermal and, yes, other electric-power stations, in that it will be brought into action by an eternal "engine." The sun shines especially generously over this corner of Crimean soil where the SES is being built, more than 2,000 hours per year. It is not without reason that from the earliest times the whole peninsula has been named "Solnechnyy [Sunny]." If the station still requires something directly from nature itself, it is only water, and in the smallest amounts, for filling up the small boiler, in which, at a pressure of 26 atmospheres, it will be brought up to a temperature of as much as 300 degrees, and for condensing spent steam. Incidentally, a water body also is nearby--this being Aktashskoye Lake, the very one which gave its name to the nuclear-power station that is being built.

"With respect to the amount of electricity that the first experimental solar station will give," General Director of the Krymenergo Production Association Ye. F. Shevchenko told me, "it can be called a pygmy: its capacity is about 5 megawatts. And its energy will be severalfold more expensive than that which is now generated at a GES or a TES. It seems that the balance sheet does not favor such stations. But this is only the first stage in the establishment of solar power. Later, as the capacity of solar power stations is increased, the costs of manufacturing the

mirrors, means of automation and other equipment for them are reduced, this balance will be equalized. But the introduction into operation of even such a little one will be an important step on the road to expanding the scale of use of the main renewable source of energy in the national economy, about which the decisions of the 26th party congress spoke. If it is considered that this source is the radiant energy of daylight, which practically never runs dry, then the game, as they say, is worth the candle. The main thing now is to build the station itself more rapidly."

And the builders--the collective of Dneprostroy Administration under section chief Engineer V. Vaneyev and installers' brigade leader A. Chernenko--are hurrying. Installers V. Larin, S. Pugachev and other pioneers are trying with all their might to bring closer the day that the station starts up. The builders and the station's future operators have decided that the testing ground should be ready in 2 or 3 months.

Yes, the testing ground is now needed most of all. Here almost 1 kilometer of track has been laid, along which a cart equipped with an instrument panel will start working in a short time. The optimal operating regime of the automation will be determined by means of a computer, and then the specialists will aim all 1,600 heliostats--the concave mirrors of the station itself--at the sun in accordance with the pattern that has been determined. In the middle of this field a metal tower will rise up to a height of 86 meters. Its "summit" will be crowned by a solar water boiler. Radiant energy collected into a single beam will, after it has heated the boiler, convert the water into steam, which will then put the turbine blades into operation. The station is not threatened by stoppage during overcast weather or at night--the design calls for accumulator tanks for hot water and steam, which can provide for operation under any conditions.

Dump trucks are running back and forth from the sites where the heliostats are being mounted--filling up a distinctive earthen "pillow" for each of them has started. The soil (and about 1½ million cubic meters of it have to be moved) is being brought from a neighboring construction project--the Samarlinskiy Reservoir.

But even after the first solar boiler starts operating, there will still be work for them here. The capacity of the Krymskaya SES will be gradually increased. Its final variant will consist of four modules, each of which will exceed 10-fold to 15-fold the firstling's solar energy. These will be not experimental but industrial installations with a capacity of 200,000-300,000 kilowatts. The electricity obtained from the sun's rays will be transmitted to the Unified Power System.

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KAZAKHSTAN ENERGY CONSUMERS TOLD TO CORRECT CONSERVATION PROGRAM DEFECTS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 15 Jul 81 p 3

[Article: "Use Fuel and Power Resources More Effectively"]

[Text] Definite work is being done in the republic to raise effectiveness in the use of fuel and power resources in the economy.

At the same time, various Kazakh SSR ministries and agencies are not meeting the established goals for saving such resources, and they are monitoring poorly the work of subordinate organizations, particularly their observance of the strictest regime for saving, fuel, electricity and heat energy.

After examining this question, the Central Committee of the Kazakhstan Communist Party and the Kazakh SSR Council of Ministers required that the republic's ministries and agencies, oblast ispolkoms, the Alma-Ata city ispolkom, and party, trade-union and Komsomol organizations take urgent measures to eliminate existing deficiencies in the use of fuel and power resources.

Kazakh SSR ministries and agencies, oblast ispolkoms and the Alma-Ata city ispolkom should define differentiated tasks for saving fuel and power resources for subordinate associations, enterprises and organizations and establish constant monitoring over their fulfillment.

The Central Committee of the Kazakhstan Communist Party and the Kazakh SSR Council of Ministers have planned a number of measures whose execution will help to raise the utilization effectiveness of fuel and power resources.

Party, soviet, economic, trade-union and Komsomol organizations should constantly work to mobilize laboring collectives to fulfill and overfulfill established tasks for savings and to eliminate nonproductive losses of fuel and energy.

In organizing and summing up the results of the socialist competition to pay greater attention to problems of savings in the consumption of fuel and electrical and thermal energy, the various forms of moral and material incentives for collectives and various workers who have achieved the best results should be used more actively.

The editors of republic and local newspapers, the State Committee of the Kazakh SSR on Television and Radiobroadcasting and the Republic's Council of Scientific and Technical Societies should consistently publicize matters of raising the utilization effectiveness and the saving of fuel and power resources in the economy.

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ENERGY CONSERVATION

CRIMEAN SOLAR POWER STATION SITED NEAR NUCLEAR-POWER STATION

Kiev PRAVDA UKRAINY in Russian 23 Jul 81 p 4

[Article by Yuriy Sinyakov, APN [Novosti Press Agency] reviewer: "A Solar Electric Power Plant"]

> [Text] The erection of our country's first solar electric-power station, with a capacity of 5,000 kilowatts (abbreviated as SES-5), has started in the Crimea, on the shore of the Sea of Azov, at Cape Kazantip.

Climatic conditions were decisive in choosing the site for it: there are about 2,000 hours of solar radiation here per year. Moreover, the Krymskaya Nuclear-Power Station is being built not far away--a construction base has been created, and there are favorable opportunities for the rational use of equipment and labor resources.

The Crimea will link up its power prospects with the AES, since there are no indigenous fossile fuels or hydropower resources here. The thermal electric-power stations that operate on the peninsula cover only a tenth of the demand. The rest of the electricity comes from far off over high-voltage LEP's [power transmission lines]. Meanwhile, the deficit will increase each year: in the Crimea, resort construction continues, and agriculture, which is based on irrigated farming, is being developed intensively.

"In order to meet the requirements of our main customers--resorts and kolkhozes," states Deputy Chief Engineer Roman Yemets of Krymenergo, "a reliable, high-capacity source of energy is required. And, certainly, a clean one, for we are talking about an area of All-Union sanatoria. Thus the idea arose of erecting a nuclear-power station in the Crimea. It was proposed that its first power unit, of 1 million kilowatts' capacity, will yield industrial current at the end of the present five-year plan."

The power of the Krymskaya Solar Experimental Power Station (5,000 kilowatts) is, of course, a drop in the sea in comparison with the AES. But this is only the first step, it is primarily an experiment. Incidentally, it has the same capacity as the world's first nuclear power station, which was built in Obninsk in 1954.

The electricity that the SES-5 will generate--the first phase should go into operation at the end of next year--will pour into the Unified Power System of the

Crimea, and the heat will go to meet the needs of farm greenhouses and the housing settlement.

...The growing housing settlement of the two power-station builders--this is for next year. It has no name yet. Possibly it will be named "Geliograd [Sun City]."

We ride on the solar testing ground past Aktashskoye Lake, which is to serve as a source of fresh water for the future station.

About 2 kilometers from the sea's shore the site of the SES-5 has risen up. A field of bright flowers stretches about the neighborhood, in surroundings of low-growing maples and poplar, acacia and wild olives.

"And soon 'a field of heliostats' will rise up here," says my collocutor, staff worker of the Power Engineering Institute imeni G. M. Krzhizhanovskiy and candidate of engineering sciences Aleksandr Treputnev. "This is a system of mirrors for reflecting and transmitting direct solar radiation--the chief element of the station."

An 80-meter tower is being raised in the center of the glittering field of mirrors. The boiler is being installed on it, which will consist of tubing over which water will be circulated under pressure. Each of the mirrors, 25 square meters in area (there are about 1,600 of them), aims its reflected rays at the boiler, which heats the water to 300 degrees Celsius. And so on--like at an ordinary thermal power station. A subject of the designers' special concern was the creation of a computer complex which will see to it that each of the 1,600 mirrors follows the sun synchronously along the vertical and horizontal axes.

In the so-called "dead zone"--a radius of 70 meters from the tower--a machine room, a pump station, and special hot-water accumulators that can support station operation at night and during cloudy weather have been sited.

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UKRAINIAN GEOLOGY MINISTER DISCUSSES 1981 FIRST HALF RESULTS

Kiev NEFTYANAYA I GAZOVAYA PROMYSHLENNOST' in Russian No 3, Jul-Sep 81 pp 3-4

[Article by I. I. Bartkiv, minister of Geology UkSSR: "New Discoveries of Ukrainian Geologists in the First Year of the 5-Year Plan"]

[Text] Like the rest of the Soviet people, our republic geologists are responding to the decisions of the 26th party congress with specific deeds.

Work collectives of the oil and gas prospecting enterprises of the Ukrainian Ministry of Geology have set into motion a widescale socialist competition to strengthen the fuel and energy bases of the nation, to improve the quality and effectiveness of geological prospecting work and, as a result, have fulfilled all of the basic geological assignments of the first half of 1981.

Five sites have been discovered: the Korzhevskoye, Kachalovskoye and Sakhalinskoye gas fields, the Trostyanetskoye and Rozhnyatovskoye oil fields in the Transcarpatian Trough. Three new oil and gas fields have been set up at existing deposits. Positive geological results have been achieved at a number of sites.

Oil and gas extraction organizations have placed into operation 7 productive exploratory wells with a total daily output of 1,180,000 cubic meters of gas and 130 cubic meters of oil and gas condensate.

Discovery of the Kachalovskoye and Sakhalinskoye sites has confirmed the high prospects of the northern side of the Dneperdonetsk Trough. Tests of the key (visa) formations of Well Number 1 at the Kachalovskoye Field resulted in a flow of 91,000 cubic meters of gas per day and of 78.6 cubic meters of gas condensate when a 14-mm diaphragm was used. At Well Number 8 of the Sakhalinskoye Field, gas on an industrial scale (142,000 cubic meters per day when an 8-mm diaphragm was used) was derived from the Serpukhovskiy Strata.

The oil and gas gusher from the Serpukhovskiy Strata at Well Number 2 of the Karakozovskoye Field is of essential significance for the further expansion of exploratory work in this zone. The oil output was 94 cubic meters per day with a 12-mm flow-regulator being used while the gas output was 27,900 cubic meters per day. Oil field geophysical and drilling data show promise of new productive strata at depths of 5,300-5,400 meters (the key stratum) within the bounds of the well-known Berezovskoye Deposits and Ukrainian Field.

A gas-flow output of 23.5 cubic meters per day was derived in the course of tests at Well Number 1 of the Salogubovskoye Field (3,770-3,774 meters, below the key geological substage).

An important result of geological prospecting work is the confirmation of high prospects for new territories of the Dneper-Donetsk Trough--large depressions and their slopes. At the Trostyanetskoye Field, in the northwest portion of the Srebnensky Depression, an oil flow of 163 cubic meters per day with a 6-mm flow-regulator was produced in testing key (visa) strata at Exploratory Well Number 9 (at the 4,682-4,689 meter interval).

Within the central portion of the Dneper-Donetsk Trough, the commercial gas-bearing capability of above-key strata at the Zapadno-Solokhovskiy Elevation has been confirmed. From the 4,690-4,784 meter interval at Well Number 65 a gas and gas condensate flow equivalent to 370,000 cubic meters per day and 101 cubic meters per day with the use of a 10-mm diaphragm has been produced. The scale of the Matveyevskoye Field has been increased as the result of the production of a gas flow from the Serpukhovskoye Strata, this from Well Number 8 (at the 3,784-3,787 meter interval). The gas output was 335,000 cubic meters per day with a 12-mm flow regulator.

At the Gupalovskoye Field, in the southern zone of the trough, the commercial gas-bearing capability of shallow layers of upper key strata (1,576-1,580 meters) has been established. At Well Number 14, the absolutely free output of gas-condensate mixtures exceeded 1 million cubic meters per day. Outright signs of the gas-bearing capabilty of Bashkir Strata in the drilling of a parametric well at the Yekaterinovskoye Field have been noted.

From the western part of the republic we have received new data on the prospects of individual fields and strata complexes.

In the Borislavsk-Pokutskiy Zone of the Transcarpathian Trough, this in tests of the menilite strata at the Rozhnyatovskoye Field, a flow of oil at the rate of 11 tons per day with a 4-mm flow regulator has been extracted from Well Number 5 (at the 4,555-4,652 meter interval).

At the Makunevskoye Field in the Bil'che-Volitskiy Zone, a gas flow (75,300 cubic meters per day with a 10-mm diaphragm) has been derived from the Sarmatian stage deposits of Well Number 2. For the first time, the commercial gas-bearing capability of the Lower Devonian strata has been established at the Lokachinskoye Field. At Well Number 5, in samplings made at the 959-1,011 meter interval and in the testing of shaft layers, a gas flow of 35,900 cubic meters per day was detected.

In the Black Sea Coastal-Crimean oil and gas bearing province deposits of oil in Karagin and Chokrak Deposits have been uncovered, this at the Semenovskoye and Ashtakskoye fields. The flow of oil from depths of 220-430 meters was 4-10 cubic meters per day with its density ranging from 0.83 to 0.91 G per cubic centimeter. In tests made of Upper Cretaceous carbonaceous deposits at Well Number 1 of the Pervomayskiy Field in the Crimean Ravine, a flow of light oil

(1.7 cubic meters per day) was received from a depth of 2,595-2,620 meters. Outright signs of oil- and gas-bearing capability have been established in Lower Maykop deposits at the Alekseyevskoye, Dubrovskoye and Zapadno-Fontanovskoye fields.

Results of the work of the first half of 1981 provide us with the basis for confidence that planned assignments for increasing reserves of oil and gas and for the discovery of new deposits in all of the oil- and gas-bearing regions of our republic will be fulfilled.

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GAS INDUSTRY UNDERGROUND INDUSTRIAL EFFLUENT BURIAL REVIEWED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 8, Jul 81 p 36

[Review by A. T. Shatalov, with the Ministry of the Gas Industry USSR, of book by A. Ya. Gayev "The Underground Burial of Industrial Effluent at Gas Industry Enterprises"]

[Text] It is well known that the use of gas in industry and in the production of electric power increases the cleanliness of the atmosphere by 7-8 times as compared with the use of other types of fuel. However, in the extraction, preparation and processing of gas and gas condensate what we are still getting is an unavoidable and harmful product, this in the form of a rather large quantity of contaminated effluent.

The most effective method for combatting the contamination of reservoirs is that of the underground burial of industrial effluent in absorbable and oil- and gas-bearing soil layers.

A book by A. Ya. Gayev entitled "Underground Burial of Effluent at Gas Industry enterprises" under the editorship of USSR Academy of Sciences Corresponding Member A. S. Khomentovskiy and Candidate of Geological-minerological Sciences O. I. Karas' was published in 1981 by the Leningrad branch of the "Nedra" publishing house.

Collected and commented upon in this book is the advanced experience of Gas Industry Ministry enterprises in the localization of untreated effluent in deep absorbing soil layers. The author has reviewed the basic questions connected with this complex scientific-technical problem: the geological-geophysical and hydrological bases for the selection of effluent localization installations deep within the earth, questions involving the physico-chemical, technological, technical-economic analysis, sanitary protection, etc. The value of this work consists of the fact that it represents original research in which the author has been directly involved for over a decade.

The greatest difficulties involved in the introduction of a method for effluent burial into production, this in respect to individual waste water groups, has to do with their physical-chemical incompatability with strata water and surrounding layers of earth. Effluent precipitation of compounds such as iron, sulfates, mechanical impurities, condensate, oil products and other substances

often lead to the calmotation of the critical zone of the absorbtion well almost to the point of putting that well out of order. If you consider the fact that every such well now costs hundreds of thousands of rubles, what becomes evident is the degree of extra expense involved in such a method of neutralizing effluent when it is incompatible with surrounding strata.

There are a number of difficulties connected with the design, construction and operation of effluent burial structures, these involving the absence of criteria for the technical and economic evaluation of water protection measures. The reader will find explanations, elaborations and recommendations in this book on these and many other questions.

The work's greatest value is represented in material devoted to enterprises of the Orenburg gas industry complex. Location of a number of installations in this complex in the floodplain of the Urals, an area vulnerable to contamination, required a high degree of production skill.

A. Ya. Gayev's book, unfortunately, fails to shed sufficient light upon questions involving prediction of the state or condition of exploited absorbtion strata in the future for a period beyond 50 years. Nor is there sufficient reflection upon the quantitative characteristics of our absorbtion strata resources. It might be desirable for the author to fill these gaps in future publications.

In spite of the shortcomings which we have commented upon, the book which we have described represents a valuable aid as to the designing, construction and operation of water protection installations, not just for enterprises of the USSR Ministry of the Gas Industry but for other branches of our national economy.

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PROGRESS, PROBLEMS IN BUILDING EKIBASTUZ FUEL, POWER COMPLEX DETAILED

Moscow STROITEL'NAYA GAZETA in Russian 26 Jun 81 p 1

[Article by V. Ovchinnikov: "ETEK [Ekibastuz Fuel and Power Complex] Picks up Speed"]

[Text] SG [STROITEL'NAYA GAZETA] at construction projects of the Ekibastuz Fuel and Power Complex, of which it is a patron.

The world's largest coal deposits are in the Ekibastuz area. The seams come close to the surface, so they can be mined by the most profitable method--strip mining.

Coal leaves here today by the millions of tons for 20 large GRES's. But this is not at all an economical approach. The greatest benefit is achieved if the coal is used locally and "finished" electricity is delivered to the customers.

This trend in the development of the Ekibastuz Fuel and Power Complex was defined in 26th CPSU Congress decisions. Five GRES's totaling 20 million kilowatts in capacity will be built in the region. Electrical bridges of 1,150 and 1,500 kilovolts will be thrown up to the Urals and the center of the European part of the country. Naturally, the Ekibastuz stations should be provided with sufficient fuel, like stations in other parts of the country. That is, the creation of a fuel base, the construction of GRES's and power transmission lines, and the development of the city and the infrastructure as a whole should be accomplished without one part of the complex lagging behind another. Only by carrying out this requirement can an accelerated pace for the development of ETEK and a high return on the capital investment be insured.

The newspaper has already told, on 15 February, in a collection of articles headed "ETEK Is Akin to the BAM [Baykal-Amur Mainline]," about the need to speed up harmonious development of the fuel and power complex. Today we return to this theme.

During the first 5 months of the year the capital-investment plan for construction of the Ekibastuz Fuel and Power-Complex was fulfilled 114.1 percent.

Today, in striving to greet the builders' vocational holiday worthily, many laboring collectives are directing their efforts toward fulfilling not "gross" indicators but project-type tasks. The main thing is the national economic benefit.

The harmonious development of all parts of the Ekibastuz Fuel and Power Complex is especially important at this stage of its creation.

The Coal: Ekibastuzshakhtostroy [Ekibastuz Mine-Construction Combine]

Out of 13.4 million rubles planned for the first 5 months of the year, only 8.7 million (70 percent) were assimilated.

By the end of the next five-year plan coal mining in the Ekibastuz basin should more than double, reaching 150 million tons per year. For this purpose more than 3 billion rubles of capital investment must be assimilated.

During the last five-year plan Ekibastuzshakhtostroy transferred to Ekibastuzugol' all the facilities of the new high-capacity Bogatyr' Strip Mine. However, as has already been reported in STROITEL'NAYA GAZETA, the pace of development of the fuel sector of ETEK is lagging substantially behind what is required. Since the start of construction, the combine has carried out only 70 percent of the task for assimilating capital investment. At the new Vostochnyy Strip Mine, more than 60 million rubles' worth of work has not been done.

A. Fridlyand, chief of Ekibastuzshakhtostroy, relates the measures that have been adopted to overcome the lag.

"Our combine, after its creation in 1977, was marking time. But great changes have been noted recently. Capacity has been increased, and the technology at the ZhBI [reinforced-concrete articles] plant has been improved. Last year we were able to turn over for operation about 44,000 square meters of housing, which is almost double that turned over in 1979, and for the first time we carried out the plan for housing construction. Capacity for the production of 5,000 tons of metal structure per year was introduced.

"The structure of the combine also is being improved: three new administrations have been established, and the functions of all subunits have been delineated with precision.

"The pace of construction at the Vostochnyy Strip Mine is growing. Augmentation of the motor-vehicle and earthmoving machinery pools is helping here. We have already been allocated 28 BelAZ's [vehicles made by the Belorussian Motor-Vehicle Plant] and soon we shall have 38 of them. We shall also receive seven 5-cubic meter excavators (last year only 1 operated). Each day 7,000-8,000 cubic meters of soil are being stripped, and there is confidence that the annual plan for 4.4 million cubic meters of capital-construction mine working will be carried out by 25 December, as called for in the collective's commitment for the first year of the five-year plan.

"A stable construction-workers' collective is being born gradually. The Komsomol Youth Brigade of erectors under A. Slyusar and the excavator crew under O. Glubokovskiy are laboring splendidly.

"However, there are not enough highly skilled specialists. In order to support uninterrupted operation of three shifts for the equipment that is building the strip mine, we need several hundred more workers--drivers and servicing personnel."

The LEP's [electric-power transmission lines]--Ekibastuzenergostroy [Trust for the Construction of Power-Engineering Facilities at Ekibastuz]

> The collective carried out the plan for construction and installing work volume for the first 5 months of the year by 98 percent (29 million rubles' worth of work).
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> The power transmission lines and the substations have no counterparts. For the first time in the world electricity will be transmitted a distance of more than 2,500 kilometers over DC lines, and, moreover, at a potential of 1,500 kilovolts. For the first time, 6 million kilowatt-hours of power will be transmitted.
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> The design of the supports is basically new. They are 42 meters high and weigh about 8 tons. Four conductors each will be hung on 46 insulators, each about 40 millimeters in diameter, on each terminal of the tower.

V. Tim, director of the Ekibastuz Electric-Power Conversion Complex of Dal'niye Elektroperedachi [Long-Distance Electric-Power Transmission Association], tells about the erection of these facilities:

"Blocks of thyristor converters--semiconductors that convert AC into DC--are placed in an enormous building of the conversion complex, which is 160 meters long, 90 meters wide and the height of a 14-story apartment building. The complicated equipment will be controlled by lasers. Slender tubing for cooling lead to each of the thyristor pots, which are the same diameter as the palm of the hand. They will require so much water that a waterline more than 1 meter in diameter is required to supply them.

"Exactly the same kind of complex is being built at the opposite end of the future LEP-1500 [1,500-kilovolt LEP]--in Tambov. Only there the conversion will take place in the opposite direction--from DC to AC."

We have tried to take a look into the near future. What is being done today to bring it closer?

Yu. Kazantsev, chief of SU-3 [Construction Administration No 3] of Ekibastuzenergostroy:

"Despite the fact that construction of the substation began in 1978, our administration, which is the general contractor for this facility, was established just in February of this year. And so we still have brought together only 50 persons out of the required 250.

"This year the site needs to be supplied with electricity and water, a foundation has to be laid, and the framework of the main building has to be erected. Right away we ran up against the problem of how to insure the delivery of structure. The existing railroad track is overloaded with coal trains headed for GRES-1. Another railroad track must be laid down for regular haulage of 130,000 cubic meters of prefabricated reinforced concrete and 55,000 tons of metal structure. However, the solution of this question is being delayed.

"Documentation is arriving poorly. Meanwhile, the establishment of a designers' work group at Ekibastuz is being hindered, despite an order from the Deputy Minister of Power and Electrification. And, of course, the main problem for us remains that of manning the construction project."

V. Kokhanov, chief engineer of Mechanized Column No 59 of Tselinelektroset'stroy [Trust for the Construction of Electric-Power Grids in Tselinogradskaya Oblast]:

"In November of last year we undertook the installation of supports for the LEP-1500. The erectors' brigades of A. Shatalov and V. Fartushnyy kept their word--all 70 supports of the first lot were installed by the day the 26th CPSU Congress opened.

"We received the supports from the Domodedovo plant in disassembled form. Assembling them was entrusted to the best brigades, which were under V. Vinokurov and N. Shcherbak. Thanks to their skill, as well as to the high quality of the structure, the assembling proceeded without special difficulties. The assembled units were sent by motor vehicles with specially equipped trailers to the place of installation, 20 kilometers from Ekibastuz. All the technological computations were made ahead of time, and it was decided to apply ordinary technology for lifting them, but a special support for reinforcing the foundation at the moment of lifting was developed. All the lifting proceeded, as they say, without a hitch.

"We are now making preparations for still another operation--hanging the conductors. This work will be done at a height almost double that at which we had previously become accustomed to working. But the collective is optimistically inclined. Only the deliveries alarm us. While the Domodedovo plant dispatches output of excellent quality, this cannot be said of the Mironovka ZhBI Plant, which manufactures the slabs for the anchor guys."

Personnel Stability of the Complex

First Secretary of the Ekibastuz City Committee of the Kazakhstan Communist Party G. Nikiforov considers the complex's personnel stability to be the main prerequisite to the harmonious development of the ETEK:

"An interesting aspect stands out today in the personnel problem: Ekibastuz now needs not simply wageworkers and not even simply highly skilled specialists, but those who intend to settle down here for a long time and work conscientiously. I will give an example.

"The first three units of the GRES-1 are, as is well known, already generating electricity. However, they are not working as continuously as we would like. New defects are still being observed, not only those of the manufacturers but also those committed during installation. When those guilty of the defects are sought out, it turns out that they have already left the construction project, having been sent here only temporarily. It turns out that personnel problems and work quality are indivisible, one from the other.

"The GRES collective lacks several hundred operators for highly skilled servicing of the operating units, for the assimilation of capacity, and for the startup and setting up work. Personnel are also needed to build substations and to work at enterprises of the construction industry, transport, and the services sphere.

"So that personnel will come here voluntarily to live and work, well-appointed housing and enterprises in the social and cultural field are needed. Last year the pace of housing construction was greatly speeded up. For the first time the plan for the introduction of housing area was fulfilled and even overfulfilled--Ekibastuzers received 114,000 square meters in new apartment houses. Many cities of the country extended help to us. Enterprises of Bratsk, Naberzhnyy Chelny and Kustanay sent us housing parts withoutinterruption. Unfortunately, the Yermak plant, which is literally next door, carries out its contract commitments poorly.

"This year Minugleprom [Ministry of Coal Industry] should build in the city 70,000 square meters of housing, USSR Minenergo [Ministry of Power and Electrification] 75,000. While the first ministry has solved all questions connected with financing construction without difficulties, USSR Minenergo still has allocated capital investment for only 51,000 square meters.

"It seems that it would be easier to provide ETEK with personnel if an organ of high authority were created that would coordinate the efforts of the many ministries and agencies. Talks about the need for a single management over subcontracting organizations and the creation of a heat-engineering installation trust for building the electric-power stations have been going on for more than a year now, but these matters have not budged.

"Most of the design organizations and scientific-research institutes that are developing the documentation for the construction of the GRES's and other power-engineering facilities are scattered throughout the country, because of which complicated questions often have to be solved without their participation. Such a lack of coordination hurts the business. ETEK is a construction project that has been designed not just for the 11th Five-Year Plan. And it is necessary to create conditions for fruitful joint work of scientists, builders and operators."

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MAKEYEVKA COAL MINE OVERCOMES DIFFICULTIES

Kiev RABOCHAYA GAZETA in Russian 11 Sep 81 p 1

[Article by V. Deshko (Makeyevka, Donetskaya Oblast): "They Have Fitted the Key"]

[Text] The Underground Mine imeni Pochenkov of the Makeyevugol' Association is a comparatively young enterprise. It produced its first coal in December 1967, and the forecasts were apparently not bad: several fairly thick seams and good coal. In brief, it was considered promising. That's how it was at first. And although the geological conditions did not pamper the miners--the gentle dip of the seams, the unstable roof, the weak soil and coal, the tendency toward spontaneous combustion--the mine's collective confidently picked up the pace and increased the enterprise's capacity.

But then disorder broke out. Since M-3, the main working seam, could no longer provide for the enterprise's daily productivity, they began using scraper-loaders to remove coal from seam K-8 and to take the upper coal member at Seam El'-1. But one circumstance did not permit them to begin working the seams properly or to increase the workload at them. Seam El'-1 is a protective seam for seam K-8, and, unless an outlet is provided for the longwall at seam El'-1, a full workload cannot be placed on the longwalls of seam K-8.

Naturally, the question can arise: why did they not follow mining's truism and and begin to work the longwalls of seam El'-1 at a more rapid pace? Moreover, there is the fact that it is fairly thick--1.9-2.4 meters. Thus, this would open up the path for intensive working of seam K-8. They tried. Many times. But the key to this seam proved to be too complicated. El'-1 had weak soil, an unstable roof, and a dip angle of 22 degrees. And there is this detail: if they do not take it completely, only the upper member, the danger of spontaneous combustion of the remaining coal is increased; and taking away the whole member would not hold up the roof.

The brigade of Nikolay Yevmenovich Trofimenko tried a pedestal with an OKU [laser], gobbing and clustered supports, but everything was in vain.

But taking from the two seams simultaneously was tempting, not only to increase recovery but also to raise coal quality: although seam El'-1 has an ash content of more than 20 percent, K-8, on the other hand, has, in all, less than 6 percent.

And a couple of days ago here, in conversing with production director of Makeyevugol' Association V. R. Vetlugin, I heard reassuring news from him:

"The collective of section No 7 of the Underground Mine imeni Pochenkov, which had long been fitting the key to seam El'-1 has brought the longwall up to the standard workload as a result."

They gave me the details at the mine. And here they are. N. Ye. Trofimenko's brigade, with a standard of 500 tons, on some days sent to the surface from the eastern longwall 600 and more tons of coal.

The chief of the shift, mine engineer V. M. Matviyenko, let me in on the details:

"It was recommended that we test at El'-1 the new MK-75 longwall mining machine that had been created at the Uzlovskiy plant. It is true, having sampled many pieces of equipment at this seam, we had little trust in its success. But the whole management of the mine, and Nikolay Yevmenovich's brigade supported the recommendation of the plant workers. Incidentally, they helped with the assembly and they acquainted the mineworkers with the peculiarities of controlling the complex. This was 2 months ago. And now the average daily workload per breakage face in the brigade has reached 570 tons. The standard has been exceeded."

The secret is in the complex's design peculiarities: each third and fourth section is anchored in such a way that it keeps the others from slipping. Moreover, the IGSh-68 cutter-loader, with which this complex is equipped, which digs itself in, allows recesses, or gets along ertirely without them, or makes them quite small. This is a 120-meter longwall, and it now gives so much coal.

But the current workload for N. Ye. Trofimenko's brigade is not considered the limit. The longwall at seam El'-1 can absolutely become a thousandeer. Simply, time is needed for the miners to assimilate the new equipment well, to find out the complex's strong and weak points with a view to organizing preventive maintenance correctly, and to prevent possible accidents. Yes, and to sharpen the brigade's skill and to improve the brigade's organization of work.

Now on priority is the following step: to fit keys of the same effectiveness to the intensive working of low-ash seam K-8. It would seem that even this task will prove to be within the capabilities of the miners of the Underground Mine imeni Pochenkov. The main thing is not to lose a taste for study, and, when it is crowned with success, this always redoubles the strength.

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DONETSK COAL MINE WORKS THIN SEAMS SUCCESSFULLY

Moscow PRAVDA in Russian 21 Aug 81 p 2

[Article by M. Bublichenko, outside correspondent for PRAVDA (Makeyevka, Donetskaya Oblast): "The Storehouse of 'Kholodnaya Balka'"]

> [Excerpts] It is 6 years now since there had been no industrial coal reserves at Kholodnaya Balka. Secretary of the party committee of the underground mine administration A. Ul'yantsev referred to this, by the way, as if it were ancient history which had no relationship to the current conversation. But it is known that the collective did complete the last five-year plan ahead of schedule, having mined half a million tons of coal above the plan, and this year it is also proceeding with a "plus." Where is the coal coming from? "From seams that are below standard and were recognized as unprofitable for industrial development," explained A. Ul'yantsev. But they are, as we see, profitable.

The path to the longwall is not short. While we walked single file along the labyrinth of the mine workings and descended along a crosscut in a special "carriage," A. Ul'yantsev and chief operating engineer of the Kholodnaya Balka Mine Administration V. Ivanov gave me the necessary information.

All these mines, which were built in the 1950's, should have yielded coal until almost the end of this century. But there was a simple explanation for the fact that already by 1976 they had practically no industrial reserves: during the operations, the design capacity was exceeded by far. For example, Underground Mine No 3, where we were, was designed for 1,500 tons per day, but it yielded about 4,000. So it had become clear at the start of the 1970's: the mine would close if reserves were not found in 5-7 years. These reserves were below standard in seam thickness. They were 40-65 centimeters thick.

Now about an extremely thin seam--the one we were approaching. It was 55 centimeters thick. I recalled a feeling of helplessness when, in trying to raise myself up a bit, I got jammed in a passage. It was necessary simply to creep along 120 meters of the mine face. The roof was reinforced with saw timber, wedged posts and letdown pedestals "repeated themselves incessantly," and the conveyor line was being moved by hand.

The history of the rebirth of the failing enterprise, which had begun 10 years ago with a memorable meeting at the office of I. Belokhvostov, then the director, should be preceded by a bit of information: 70 percent of Kholodnaya Balka's total coal reserves are in below-standard seams, or seams that are "not carried on the books."

The situation was complicated. The ministry was ready to allocate the money if there was a design. But the institute did not have the right to draw up a design on the basis of low-grade seams. They got out of the vicious circle this way: they made up the design themselves, they legitimated it with the seal of the then existing combine, and they established new brigades from internal reserves.

The seams that were "not carried on the books" revealed their secrets unwillingly. They discovered one thing--gas was pouring out, so abundantly that even the specialists were surprised: why so much of it in a thin interbedding....As soon as they cut a longwall, it turned out that there was not enough air. The renowned brigade of N. Tsybul'skiy drove a ventilation crosscut by a speedy method. They dragged a cutter-loader to the mine face in order to take coal from a place next to barren rock, but the rock proved to be beyond the Kirovets's capabilities: it was as if the machine's cutters had cut into emery, and it did not withstand the overload. Cutter-loaders were changed more than once until they realized: it was necessary to retreat.

All-round expert brigade-leader V. Krivoy undertook to make a scraper-loader installation. The unit did not appear unusual, but when they began to test the home-grown item, it turned out that the difficulties had just begun...."The assimilation of technology for excavating thin seams"--they called this exhausting work, and they were engaged in it for almost 3 years.

The chief result: from seams that previously had been buried in the mine, today they are taking a million tons of coking coal each, annually. A new mine of this capacity would cost hundreds of millions of rubles.

At Dongiproshakht [Donetsk State Institute for the Design of Underground Coal Mines] they gave me this information: a little less than 40 percent of all the coal reserves in the fields of Donetskaya and Voroshilovgradskaya Oblasts are contained in seams that are "not carried on the books." And since many of the older mines are experiencing the fate of Kholodnaya Balka, the collective's experience is acquiring special importance.

The matter is not so much the way the coal is dug as the method of supporting the roof. You do not force a long-wall mining machine onto a longwall of fine seams, yet scraper-loader installations have an overall deficiency--they involve individual timbering, that is, the longwall is timbered manually. Therefore the prime production costs of the coal are higher.

When the scientists worked over the scraper-loader that had been made at the Kholodnaya Balka and turned it over for series output, the miners hoped to obtain a reliable machine. Their expectations were not justified. The weak electric motors (the Pervomaysk Plant imeni K. Marks, which is in Voroshilovgradskaya Oblast, supplies them) burn out, they do not withstand the repeated "back-and-forth" switching, and they are not accepted for repair work.

Meanwhile, a test model of a more powerful motor has been under test for a long time. It works excellently, but its serial output still has not been arranged. The chain's connecting links can be strengthened, but the plant cannot change the standard.

The miners are somehow adapting themselves. If the rock is soft, they use the Kirovets cutter-loader. In Makeyevka's Yasinovskoye Mine Administration they are working a seam 40 centimeters thick. True, they are taking as much rock as coal. At other underground mines of the basin they are also getting fuel from the adjacent sections of boundary rock. This is a lot of extra expense. One could be reconciled to this if we were talking about one auxiliary longwall. But what are the miners to do at such large mines in Rostovskaya Oblast as the Yuzhnaya, Mayskaya and Vostochnaya, which soon are to convert on the whole to thin and extremely thin seams, where 80 percent of the reserves are concentrated?!

The "Main Directions" for the country's economic and social development which the 26th party congress adopted, set the task of introducing unmanned coal excavation. Such a method is of great significance.

"Unmanned coal excavation has been introduced at Donetsk's Underground Mine imeni Gazeta PRAVDA," remarks V. Ivanov. "They slit the longwall with crosscuts every 25 meters and take the coal with scraper-loader installations without mine supports. But they cut the longwall manually, and people are needed for this. This means one must think also about creating means for mechanizing preparatory operations. The problem can be solved in a short time if the quality of the mechanisms is raised, the output of spare parts is arranged, and the new machines are refined and put into series production. At Ukrzapadugol' enterprises, test models of augering machines created by DonUGI [Donetsk Scientific-Research Institute for the Coal Industry] are in operation; in our view, they are promising."

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EKIBASTUZ BUILDERS BLISTERED FOR SHUNNING HOUSING CONSTRUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Jul 81 p 2

[Article by G. Kaskaldakova, delegate to the 26th CPSU Congress and lifting equipment operator of Ekibastuzshakhtostroy [Ekibastuz Mine-Construction Combine] (Ekibastuz): "What the Reports Do Not Say"]

[Text] It is about 20 years now that I have been living and working in Ekibastuz. The whole country knows about the business of the workers of the young city. A high-capacity fuel-and-power complex is being established here that will provide electricity for many parts of Central Asia, the Urals and the country's central region. Capacity for 70 million tons of coal per year has been introduced at Ekibastuzugol' [Ekibastuz Coal-Mining Association] strip mines. Already three power units of the Ekibastuzskaya GRES-1, whose total capacity is 1,500 megawatts, are operating. Five railroad yards have been built, 120 kilometers of track have been laid, and electrification of the Yermentau-Ekibastuz line has been completed. In accordance with the "Main Directions," which were adopted at the 26th Party Congress, increases in coal mining and in the construction of enterprises of other branches of industry continue at the Pavlodar-Ekibastuz Regional Production Complex.

But here is what calls attention to itself and worries the city's workers. At each slightest perceptible success at enterprises or construction projects at Ekibastuz, the managers blow their horns with all their might. They send victorious reports and telegrams to the ministries. But when it comes to the erection of housing and of facilities for cultural and personal-amenity purposes, they modestly hold their tongues. They hold their tongues because there is nothing special to praise. The construction of these facilities lags immeasurably behind the growth of the fuel and power potential of the whole complex.

Comrade L. I. Brezhnev spoke from the rostrum of the 26th CPSU Congress about the fact that the party henceforth will deal strictly with economic managers who treat the social development of enterprises, cities and villages as something secondary. And then I wanted to find out and explain more thoroughly and in more detail why it is that housing, children's institutions and cultural and personal-amenity facilities are being built so poorly in Ekibastuz. At conferences, at meetings of the party's economic activists, and at plenums that I have attended as a candidate member of the gorkom, I began to listen especially attentively to what precisely was being said about this.

During the last five-year plan the Ekibastuzshakhtostroy Combine and Ekibastuzenergostroy [Trust for the Construction of Power Facilities at Ekibastuz] failed with a bang to meet the plan for introducing housing and social, cultural and domestic-amenity facilities. Our combine failed to introduce 36,000 square meters of housing area. Through the fault of both Ekibastuz construction organizations we failed to receive three kindergartens, a social and shopping center, a House for Personal Amenities, a hotel, a Palace of Culture, a sports complex with two swimming pools, a stadium and other facilities during the last five-year plan. This could not help but reflect on production and the city's social life.

Let us take, for example, our combine. This year the plan here does not cover more than a thousand persons. People are leaving us mainly because there is not enough housing and vacancies in kindergartens. There are now about 700 people in line to obtain apartments, and 430 women are waiting for places in children's institutions. And altogether throughout the city--within the Ekibastuzugol' Association and the Ekibastuzshakhtostroy Combine--8,000 families have not been provided with housing!

At each conference in the party gorkom and the city ispolkom, the managers of the construction organizations (Ekibastuzshakhtostroy Combine--A. Fridlyand, and the Ekibastuzenergostroy Trust--E. Filatov) promise to correct the matter, but they do not keep their word. And matters do not improve, they get worse. And all because of the fact that the burden of old errors that were made in the first stages of the formation of the fuel and power complex dominates them. The fact is that they began to build it without an in-house base. Neither the power workers nor the mine builders had one. Building materials and reinforced-concrete structure were brought in from far away. Everything that arrived went primarily to the construction of industrial facilities. The erection of housing and facilities of social, cultural, and domestic-amenity facilities were right away consigned to second priority.

Bases that are capable of supporting integrated construction still have not been established in Ekibastuz. Moreover, the slowness with which the concrete-products plant which belongs to the Ekibastuzshakhtostroy Combine is being rebuilt is incomprehensible. In their turn, the power-engineering workers of Ekibastuzenergostroy Trust have laid the foundations finally for a large-panel housing construction plant, but they are erecting it at a very slow pace. Under a plan for 3.3 million rubles' worth of work since the start of this year, during the first 5 months of the year 340,000 rubles' worth of work was performed. The construction project has not been completely staffed. And those who are working are often idle because of a lack of mechanisms and materials.

So the words of the managers of Ekibastuzshakhtostroy Combine and Ekibastuzenergostroy Trust, as before, disagree with reality. Any "interruption" at the industrial site is eliminated primarily by stripping the construction of housing and social, cultural and personal-amenity facilities. The attitude toward these facilities, need it be said, is indifferent. But let the reader judge. At the end of last year the state commission accepted for operation a kindergarten built by an Ekibastuzenergostroy collective. However, the place could not function. So much uncompleted work was discovered that the acceptance certificate had to be annulled. One would expect that the trust would react responsively to this disgraceful case. However, several months have passed but nothing has been done at the kindergarten....

On returning from the congress, I expected that the managers of our large construction organizations, having been imbued with the importance of the decisions adopted at it, would, of course, finally change their attitude toward the construction of housing and domestic-amenity facilities. But no special changes have been observed. The plan for introducing housing in the first quarter was not met. And the situation has not improved during the first 5 months of the year.

How do our managers explain the lag? On this subject, they have, again, one excuse--not enough people. However, if you look at it, the trouble is not so much a shortage of personnel as the disdainful attitude of USSR Minenergo [Ministry of Power and Electrification] and Ekibastuzenergostroy Trust, and Minugleprom [Ministry of Coal Industry] and the Ekibastuzshakhtostroy Combine toward housing and cultural and domestic-amenity facilities. The prestartup days at the Bogatyr' Strip Mine and of the first power units of the GRES are recalled. At that time, as a rule, they concentrated the necessary number of people there. And where did they get them from? Mainly they took them from apartment houses, kindergartens, schools, stores and so on.

But why, strictly speaking, do construction-project managers permit such a liberty? The ministries cover their eyes to this. Here they are always ready to inquire with all severity about an interruption in the construction of an industrial facility, but for a delay in the construction of an apartment house or a dispensary they can only reprove people verbally. So one should study this lenient policy for the source of the cold attitude toward housing and social, cultural and personal-amenity facilities in Ekibastuz.

How else can one explain, let's say, this case. Twelve thousand persons are working in Ekibastuzenergostroy Trust, but only a thousand are engaged in the construction of housing, cultural and personal-amenity facilities. There is the same approximate ratio of forces also in our combine. T. Vasil'kova, operator of the Solikamsk Mine Administration of the Uralkaliy Association, put the question completely correctly in the newspaper (SOTSIALISTICHESKAYA INDUSTRIYA of 16 June, this year). One can no longer be reconciled with the fact that in industrial cities a gap has been tolerated between the growth of capacity and the development of housing, cultural and personal-amenities construction.

Actually, difficulties do exist in Ekibastuz in assembling a work force. But this does not mean that managers can order people around in any way they see fit. They should be distributed proportionally in accordance with existing plans for the construction of industrial and housing facilities. It is time, finally, to understand that they must not erect one to the detriment of the other. And that the decisions of the party congress should be carried out strictly as the conscience and duty of communists dictate.

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